

Claims

- [c1] 1. A structure of a liquid crystal display, comprising:
- a first polarizer, having a first polarization direction along a first angle;
 - a first wide view film disposed under the first polarizer, the first wide view film being oriented with a second angle perpendicular to the first angle;
 - a liquid crystal layer disposed under the wide view film, the liquid crystal layer having a plurality of liquid crystal molecules aligned along the second angle;
 - a second wide view film disposed under the liquid crystal layer and oriented with the first angle;
 - a second polarizer disposed under the second wide view film with a polarization direction along the second angle;
 - and
 - a first phase retardation plate disposed between the first polarizer and the first wide view film or between the second polarizer and the second wide view film, wherein the first phase retardation plate is operative to produce a phase retardation effect and has a slow axis oriented along the polarization direction of either the first polarizer or the second polarizer to which the first phase retardation plate corresponds.

- [c2] 2. The structure according to Claim 1, wherein the first phase retardation has a product of differential refractive index Δn and a thickness d ranged between about 20nm to about 300nm, where the differential refractive index Δn is the difference between refractive indices of a fast axis and the slow axis of the first phase retardation plate.
- [c3] 3. The structure according to Claim 1, further comprising a second phase retardation plate disposed between the second polarizer and the second wide view film when the first phase retardation plate is disposed between the first polarizer and the first wide view film.
- [c4] 4. The structure according to Claim 3, wherein the product of differential refractive index and the thickness for the second phase retardation plate is between about 20nm to about 300nm.
- [c5] 5. A structure of liquid crystal display, comprising:
a first polarizer, having a first polarization direction along a first angle;
a first wide view film disposed under the first polarizer, the first wide view film being oriented with a second angle perpendicular to the first angle;
a liquid crystal layer disposed under the wide view film,

the liquid crystal layer having a plurality of liquid crystal molecules aligned along the second angle;
a second wide view film disposed under the liquid crystal layer and oriented with the first angle;
a second polarizer disposed under the second wide view film with a polarization direction along the second angle;
and
a first phase retardation plate disposed between the first wide view film and the liquid crystal layer or between the second wide view film and the liquid crystal layer,
wherein the first phase retardation plate is operative to produce a phase retardation effect and has a slow axis oriented along the polarization direction of either the first polarizer or the second polarizer to which the first phase retardation plate corresponds.

[c6] 6. The structure according to Claim 5, wherein the first phase retardation plate has a product of differential refractive index Δn and a thickness d ranged from about 20nm to about 100nm or from about 400 nm to about 600 nm, where the differential refractive index is the difference between refractive indices of a fast axis and the slow axis of the first phase retardation plate.

[c7] 7. The structure according to Claim 5, further comprising a second phase retardation plate disposed between the second wide view film and the liquid crystal layer

when the first phase retardation plate is disposed between the first wide view film and the liquid crystal layer.

[c8] 8. The structure according to Claim 7, wherein the product of differential refractive index and the thickness for the second phase retardation plate is ranged about 20nm and about 100nm or about 400nm and about 600nm.

[c9] 9. A structure of a liquid crystal display, comprising:
a polarizer, with a polarization direction along a first angle;
a wide view film disposed under the polarizer, wherein the wide view film is orientated to a direction with a second angle perpendicular to the first angle;
a liquid crystal layer disposed under the wide view film, the liquid crystal layer having a plurality of liquid crystal molecules orientated along the second direction; and
a phase retardation plate disposed between the polarizer and the wide view film or between the wide view film and the liquid crystal layer, wherein the phase retardation plate is operative to generate phase retardation effect with a slow axis thereof identical to polarization direction of the polarizer.

[c10] 10. The structure according to Claim 9, wherein the phase retardation has a product of differential refractive

index Δn and a thickness d ranged between about 20nm to about 300nm, where the differential refractive index Δn is the difference between refractive indices of a fast axis and the slow axis of the phase retardation plate.

[c11] 11. The structure according to Claim 9, wherein the phase retardation plate has a product of differential refractive index Δn and a thickness d ranged from about 20nm to about 100nm or from about 400 nm to about 600 nm, where the differential refractive index is the difference between refractive indices of a fast axis and the slow axis of the phase retardation plate.

[c12] 12. A wide view film device, comprising:
a first adhesion substrate;
a wide view film on the first adhesion substrate;
a first TAC substrate covering the wide view film;
a second adhesion substrate on the first TAC substrate;
a phase retardation plate on the second adhesion substrate;
a PVA aligning film on the phase retardation plate;
a second TAC substrate covering the PVA aligning film;
and
a protection film on the second TAC substrate.